DOCUMENT RESUME

ED 216 586 HE 014 992

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TITLE Freshman Attrition and the Residential Context.
PUB DATE Mar 82
NOTE 26p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York, NY, March 1982).

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Persistence; College Environment; *College Freshmen; *College Housing; Dormitories; Females; Higher Education; Longitudinal Studies; Males; *On Campus Students; *Peer Influence; Private Colleges; *Residential Colleges; Student Attitudes; *Student Attrition; Student Experience; Student Motivation

ABSTRACT

The influence on freshman student attrition of the group with whom a student lives (i.e., the composition or contextual character of the collegiate residence unit) was investigated. Based on Tinto's (1975) model of college student attrition, a longitudinal study was conducted at a large, independent, residential university in New York State having a total undergraduate enrollment of approximately 10,000. Responses from 1,457 students to an initial questionnaire were evaluated in the summer of 1976 to assess students' expectations of a variety of aspects of the college experience, as well as selected background information. During the spring semester of 1977, a second questionnaire sought information on the reality of college experience. Usable responses were received from 763 freshmen. After controlling for students' precollege characteristics and individual levels of academic and social integration in the institution, the residence unit context was found to be reliably related to attrition/retention among men, but not among women. For men, those living in a residence unit characterized by comparatively higher levels of occupant commitment to the institution and to personal goals were significantly more likely to enroll as sophomores than were freshmen in units with lower levels of commitment among the residents. The results suggest that in assessing the influence of residence arrangements on attrition (or on any other educational outcome), the influence of the context of the residence can be differentiated (at least for men) for the influence of the unit's type (e.g., dormitory, fraternity/sorority). (SW)

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FRESHMAN ATTRITION AND THE RESIDENTIAL CONTEXT

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Paper presented to the annual conference of the American Educational Research Association, New York, March 1982.

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FRESHMAN ATTRITION AND THE RESIDENTIAL CONTEXT

Abstract

This study assessed the influence on freshman student attrition of the composition of the group with whom a student lives. After controlling for students' pre-college characteristics and individual levels of academic and social integration in the institution, the residence unit context was found to be reliably related to attrition/retention among men, but not among women. For men, those living in a residence unit characterized by comparatively higher levels of occupant commitment to the institution and to personal goals were significantly more likely to enroll as sophomores than were freshmen in units with lower levels of commitment among the residents. The strengths and limitations of contextual analysis for the study of institutional impacts are discussed.

FRESHMAN ATTRITION AND THE RESIDENTIAL CONTEXT

No shortage of college attrition studies exist, as the excellent literature reviews of Spady (1970), Tinto (1975), Cope and Hannah (1975), Pantages and Creedon (1980) and Lenning, Beal and Sauer (1980) amply demonstrate. And an equally voluminous literature exists describing the impact of various types of residential arrangements on an impressive array of student educational outcomes (see, for example, Williams & Reilly, 1974). Despite the abundant literature in both of these areas, however, only a virtual handful of studies explore the role of collegiate living arrangement in students' decisions to continue or terminate their enrollment at an institution.

The apparent disregard of the relation between residence arrangement and attendance patterns is all the more remarkable when one considers that "more than half of all students . . . live in a college dormitory as freshmen" (Astin, 1975, p. 90). Moreover, not only do large numbers of students live in institutionally-controlled housing, but those residence units may constitute the center of the social, if not academic, world for many, perhaps a substantial majority, of their occupants.

The research that exists is consistent in suggesting that where students live while in college affects their chances of continued enrollment. Alfert (1966), for example, found that students living in boarding houses or other off-campus private

rooms had the highest attrition rates, followed by students living at home. For men, retention was highest among those living in dormitories or cooperative housing, while women living in sororities had a higher probability of continuing their enrollment compared with those living in other forms of housing.

Astin (1975), in a national study of the influences on student attrition, found that "Living in a dormitory during the freshman year increases the student's chances of finishing college. These positive effects exist for men and women, for blacks and whites, and in nearly every type of institution" (Astin, 1975, p. 158). Astin also found that "Living in sorority or fraternity houses during the freshman or sophomore years increases students' chances of persistence in much the same way as dormitory living" (Astin, 1975, p. 159).

Despite these and other studies, we still know comparatively little about the specific, internal features of various residence arrangements--the residential context--that are influential in students' attendance decisions. The reasons for this comparative ignorance are two-fold.

First, a significant majority of the available studies of residence arrangement effects on retention fail to control for individual differences among students at the time they entered college. Thus, influences that appear to be attributable to residence arrangement may, in fact, be a function of what the students were like before they entered college.

Second, with one notable exception, existing studies link attrition to the type of residence the students occupied prior to withdrawal (e.g., residence hall, fraternity or sorority, parents' home, off-campus room or apartment, and so on). These studies have adopted analysis of variance or covariance models with residence arrangement treated as a dichotomous, dummy coded variable. With such models, clearly, there can be no decomposition of the global residence effect into its constituent elements; no statements are possible about the absolute or relative importance of specific characteristics of the group setting or context on attendance behaviors or any other educational outcome. As Burstein (1980, p. 143) notes: "the use of . . . dummy coded variables to account for individual outcomes can determine the existence of group effects, but it cannot identify their source. Other more proximal measures . . . are needed to identify them."

Virtually no study, however, examines the varying contexts within major residential types and how those variations may influence attrition or retention. Only Nasatir (1969) appears to have tried to move beyond the analysis of residential type differences. He classified individual students and residence halls as either "academic" or "non-academic" and found that the withdrawal rate was highest in those cases where the individual student's orientation was at odds with that of the residence hall.

Pascarella and Terenzini (1982) have called attention to "contextual analysis" as a potentially fruitful means for

disaggregating the overall residence effect into some of its salient components. "Contextual analysis" is a methodology common in the "school effects" literature of sociology, but little understood and virtually unused in the study of collegiate institutions and students. In its simplest form, contextual analysis can be defined by the following regression equation:

$$Y_{ij} = a + b_1X_{ij} + b_2\bar{X}_j + \text{error}$$

where Y_{ij} represents some student behavior (in this study, attrition/retention behavior) of the ith student in the jth group (here, residence arrangement); X_{ij} represents some individual student trait, and $\bar{X}_j$ is the average (mean) value of a student trait for the students in group j. The error term represents all causes of Y_{ij} unspecified by the model. According to Burstein (1980, p. 144), "contextual effects refer to the effect of this aggregate measure of context, $\bar{X}_{1.}$, on individual outcomes, Y_{ij}, net of the individual's effect, X_{ij}, for the same variable." The coefficients "a" (a constant), and b_1 and b_2 (unstandardized regression coefficients) can be estimated by ordinary least-squares regression procedures. Throughout, the individual student is the unit of analysis, with the group average ($\bar{X}_j$) representing a specific dimension of the contextual or group-compositional effect. Additional individual and contextual-level variables can, of course, be added to specify the model more fully.

The present study had two purposes: first, to assess the

degree to which the nature of the group with whom a freshman college student lives (i.e., the compositional or contextual character of the collegiate residence unit) may influence that student's decision whether to continue enrol'ment into the sophomore year, and, second, through treatment of attrition as one educational outcome, to explore the potential utility of contextual analysis for the investigation of other educational outcomes.

METHODOLOGY

Theoretical Framework

Tinto's (1975) model of college student attrition was adopted as an appropriate theoretical basis for this study. In brief, the Tinto model views attrition as a longitudinal process involving a complex series of socio-psychological interactions between the student and the institutional environment. According to this theory, the student brings to college such characteristics as family background and personal attributes and experiences, each of which is presumed to influence not only college performance, but also initial levels of goal and institutional commitment. These characteristics and commitments, in turn, interact with various structural and normative features of the particular college or university and lead to varying levels of integration into the academic and social systems of the institution. According to Tinto: "Other things being equal, the higher the degree of integration of the individual into the college systems, the greater

will be his commitment to the specific institution and to the goal of college completion" (Tinto, 1975, p. 96).

In the present study, residential units were presumed to be significant environments through both their sociological structures and the normative influences exerted by their occupants. Structurally, residence units might be expected to influence the nature of students' collegiate experiences both through their physical configurations and consequent influence on the nature and extent of students' interactions with one another, and through the sorts of rules that govern student behaviors, as well as the academic and social experiences afforded students through the nature of the social and academic programming conducted within the residence unit. Residence units might also, however, be expected to exert a normative influence on students through such mechanisms as peer pressures and the social and intellectual value systems that develop consequent to college students living in close proximity to one another. In this investigation, it is not possible to differentiate among the origins of the influences of the residence unit on students' attrition/retention behaviors, but rather only to discover whether different influences can be discerned. This study, thus, was concerned with determining whether the global effect of residence unit could be disaggregated into some of its components, rather than with why one or another component was influential in students' attendance behaviors and others were not.

Design and Sample

This longitudinal study was conducted at a large, independent, residential university in New York State having a total undergradute enrollment of approximately 10,000 undergraduate students. In July 1976, a simple random sample of 1,905 persons was drawn by computer from the total population of incoming freshmen. Sample members were sent a detailed questionnaire designed to assess their expectations of a variety of aspects of the college experience, as well as to collect selected background information. Usable responses were received from 1,457 students (76.5 percent of those who subsequently enrolled). During the spring semester of the following year (1977), a second questionnaire was mailed to these 1,457 students seeking information on the reality of their college experience. After a mail follow-up, usable responses were received from 773 freshmen (53.1 percent). Chi-square goodness-of-fit tests (or t-tests, as appropriate) indicated that the 773 freshmen were representative of the freshman population from which they were drawn with respect to sex, racial/ethnic origin, college of enrollment, academic aptitude (SAT scores) and freshman year cumulative grade-point average.

A review of each student's records in September 1977 indicated that 10 of the 773 had been dismissed or advised to withdraw because of unsatisfactory academic performance, and 90 (50 men and 40 women) had voluntarily withdrawn from the university at the end of their freshman year. Since the study focuses on voluntary

withdrawal, the 10 academic dismissals were excluded from all further analyses. (The voluntary withdrawal rate of 11.8 percent in this sample is comparable to previous known freshman year voluntary withdrawal rates at this institution.)

While it might be argued that Tinto's (1975) model is intended to explain attrition during the second, third and subsequent years of college as well as in the first year, evidence from Iffert (1958), Eckland (1964), Marsh (1966), and Rootman (1972) strongly suggests that attrition is heaviest at the end of the freshman year. Consequently, it was judged that analyses using a freshman year sample would provide a reasonable estimate of the residential contextual effects, if any.

Variables and Measures

The following measures of entering student characteristics were statistically controlled in this study:

Race (dummy coded, where 0 = minority and 1 = non-minority);

Initial program of enrollment (liberal arts or professional, decided prior to registration);

Parents' combined education (seven ordinal categories for each parent, from "some grammar school" to "graduate degree");

Number of high school extracurricular activities (of two or more hours per week on the average; the number plus 1, taken as a natural logarithm to correct for skewness in the distribution);

Highest academic degree sought (three ordinal categories, from bachelors to doctorate);

Importance of graduating from college (from 1 = very important to 4 = not at all important);

Parents' combined annual income (as a natural logarithm of thousands of dollars);

Expected number of informal contacts with faculty (per month of ten minutes or more outside class; the number plus 1 taken as a natural logarithm);

High school achievement (percentile rank in high school class);

Academic aptitude (combined Scholastic Aptitude Test [SAT] scores).

Tinto's twin concepts of academic and social integration were operationalized by students' responses to 34 Likert scale items specifically designed to measure various dimensions of social and academic integration. The items are from Pascarella and Terenzini (1980). These items constitute five factorially-derived scales labeled "Peer Group Relations," "Academic and Intellectual Development," "Informal Relations with Faculty," "Faculty Concern for Student Development and Teaching," and "Institutional and Goal Commitment." These five scales have internal consistency (Coefficient Alpha) reliabilities ranging from .71 to .84. Students' freshman year cumulative grade-point average and the reported number of organized extra-curricular activities in which students engaged were also included as indices of academic and social integration, respectively.

Contextual effects in each of seventeen residence units were operationalized in two sets, one representing the compositional effect due to students' background traits, the second constituting the contextual effect presumed to derive from students' collegiate experiences. In both sets, students occupying the same residence

unit were assigned (for each contextual effect variable) the group mean for their residence unit.

Thus, each model was specified to comprise four variable sets, entered in the following order: 1)covariates, consisting of eleven pre-matriculation traits of individual students; 2) seven individual-level integration measures, consisting of the five scales, GPA and extracurricular activities; 3) eleven contextual variables derived from students' pre-college characteristics, and 4) seven contextual variables derived from students' levels of integration in the university's academic and social systems.

The dependent variable, freshman year voluntary persistence/withdrawal behavior, was dummy coded, where 1 = persisters and 0 = voluntary withdrawals. Data on this varible were obtained from students' official university records in September 1977 (the start of the sophomore year).

Statistical Analysis

Hierarchical, setwise multiple regression was adopted as the principal analytical procedure for this study. Separate regressions were run for men (n=399) and women (n=357). Within each of these samples, a simple weighting algorithm was developed to control for differences in residence unit size. The responses of each student within a particular residence grouping were weighted so that the aggregate responses of all residence groupings would contribute equally to the regression analysis.

The increment in R2 was tested to assess the power of the sets

of contextual measures to explain variance not attributable to individual level variables. If a set made a reliable increment in R^2 after controlling for students' individual pre-college characteristics and levels of academic and social integration, then the beta weights for each of the varibles comprising the significant set were tested to identify the particular features of the residential context that were related to students' attendance behaviors.

RESULTS

Table 1 summarizes the results of the two regressions, reporting both the overall R^2 following the entry of each variable set (the "cumulative" R^2) and the R^2-change, the increase in explained variance attributable to each set upon entry into the model. As can be seen in the table, the overall model was significant in both analyses, but the entry of the contextual variable sets produced a reliable increment in the R^2 only in the analysis for men, and then only upon the entry of the integration contextual variable set.

More specifically, the entry of the contextual set consisting of men's pre-college traits produced an increase in the R^2 of only 1.8 percent, a statistically non-significant amount ($F=.949$, $d.f.=10/371$). The entry of the contextual set of integration measures produced a reliable, if modest, increase of 3 percent ($F=2.188$, $d.f.=7/364$, $p<.05$). The overall model for men yielded an

F of 4.75 (d.f.=34/364, p<.001).

In the regression for women, neither set of contextual variables produced a statistically reliable increase in the explained variance. Interestingly, the overall regression model for women explained almost precisely the same amount of variance in attendance behaviors as was explained by the full model for men.

Table 2 arrays the beta weights for the individual variables comprising the contextual integration set for men (the only contextual set to increase the R^2 significantly). As can be seen there, the significant increase in R^2 appears to be produced principally by the Intellectual and Goal Commitment scale, with perhaps some help from the grade performance of residents. The test of the magnitude of the Commitment scale's beta weight (.40) produced an F-ratio of 6.872 (d.f.=1/364, p<.01). That scale consists of six items describing such things as the importance tne student attaches to graduation from college, the confidence the student has that a right decision was made in selecting this university, the importance to the student of good grades and the student's certainty about what to major in. The internal consistency reliablity of this scale is .71.

Limitations

This study is limited in several respects. First, it was conducted at a single institution, and the nature of the entering students and their freshman year experiences may or may not be representative of those at other institutions. Second, the model

is concerned with predicting (and differentiating between) voluntary attrition and academic dismissal; this study confined itself to voluntary withdrawal only. Third, the variables used in this study probably only begin to reflect the complexity of the Tinto model's major constructs. Finally, the study is limited by the number and nature of the variables adopted to operationalize the effects of residence hall context on students' decisions to withdraw or continue their enrollment. Because of the importance of this and other considerations related to contextual analysis, they are discussed more fully below.

DISCUSSION

The results of this analysis are consistent with those of other studies indicating that students' college residence units influence whether they are is likely to withdraw from school after a year or continue their enrollment (e.g., Alfert, 1966; Nasatir, 1969; Astin, 1975). More interestingly, the results suggest that in assessing the influence of residence arrangement on attrition (or on any other educational outcome), the influence of the context of the residence--the compositional character of the unit deriving from the kinds of students living there--can be differentiated (at least for men) from the influence of the unit's type (e.g., dormitory, fraternity/sorority). More specifically, the male freshmen in this study appear to have been influenced in their attrition/retention decisions by the level of institutional and

goal commitment of the students with whom they lived. Although a similar contextual or compositional effect was not identified among women students, it is conceivable that a somewhat different set of contextual variables in this study might have revealed a similar influence on women.

It has been noted that the magnitude of the effect attributable to the level of institutional and goal commitment in the residence unit is comparatively small (3 percent). Such a result is not unexpected, however, given the conservative nature of the analytical procedures. Werts and Linn (1971, pp. 412-413) note that in hierarchical regression, when covariates and independent variables are correlated (as they invariably are in nonexperimental research), the extraction of variance explained by the covariates also removes some of the variance explainable by the independent variables. The variance thus explained by the independent variable set is "unique" variance--variance unattributable to any other variable in the model--and, consequently, an underestimate of the explanatory power of the independent variable(s). Moreover, Firebaugh (1980) has noted that "contextual analysis may not give a complete accounting of group effects, since the composite group effect may be caused by . . . group characteristics which are not contextual. Contextual variables may be statistically significant, yet account for relatively little of the group effect" (Firebaugh, 1980, p. 21). And as Alexander and Eckland (1975, p. 402) have noted about the modest results of the "school effects" literature

in sociology, "Recognizing that such influences are likely to be modest does not, however, mean that they must also be uninteresting or unimportant."

The results of this study have practical, theoretical and methodological implications. First, the findings have relevance for the administration of collegiate residence units. The findings are consistent with those of Pascarella and Terenzini (1982), in which a contextual residence effect was found to influence students' collegiate grade performance. To the extent that the compositional character of residences can be influenced by administrative action (e.g., through room/floor/hall assignments, or intra-unit programming), then the context of these units might be purposefully shaped to facilitate the educational mission of the institution.

Second, the results are consistent with theoretical expectations based on Tinto's (1975) model of college student attrition. It is reasonable to expect students' intra-residential interactions with other students and the ambience of their living unit to have some influence on their behavior. This study suggests that men living in a residential environment characterized by a comparatively higher level of institutional and goal commitment among the residents are more likely to continue their education than are men living in residential units whose occupants have lower commitment levels. Given that the residence halls on many campuses (and some in this study) are large, multi-story structures, the

modest increment in the variance explained noted earlier may well be due in part to imprecision in the specification of the unit of analysis. Whereas the unit of analysis in this study was the entire residential unit, the selection of this level may have added unnecessarily to the within group variance, making real differences more difficult to detect. It seems reasonable to suggest that a larger sample of students, and adoption of a less-aggregated unit of analysis (e.g., floor or wing within large units) may produce greater differentiation and increased predictive power.

Thus, one needs to be clear about the appropriate level of student aggregation and analysis. Indeed, Tinto's model itself might be specified more precisely to reflect the distinct possibility that students are influenced less by any unitary, institution-wide environment than by a series of sub-environments that they occupy. The same student, for example, might be thought of as occupying multiple sub-environments at the same time (e.g., as a member of a residence unit, an athletic team and an academic department), as well as different sub-environments over the course of a college career (e.g., changes in residence unit, major and so on). The influences of these sub-environments, sub-cultures or sub-groups are, however, only dimly understood as yet.

The comparatively modest results of this study raise additional theoretical and methodological questions, however. In a discussion of the role of level of analysis in the study of educational effects, Burstein (1980) suggests that what have here

been called contextual effects may be confounded with a "frog-pond" effect, as a result of which a student may be influenced as much or more by his or her relative standing in a group on the variable in question as by the actual or absolute level of the trait among other members of the group. Burstein then demonstrates that the regression weights for individual, contextual and frog-pond effect terms in a regression cannot be estimated simultaneously, that the three terms are linearly dependent and, consequently, that only two of the three are needed in the model. The issue, of course, is which two should be retained. Few persons would wish to delete the individual student term, but the choice between contextual and frog-pond effects is far from clear. Firebaugh (in Burstein, 1980, p. 153), has suggested deletion of one term on theoretical grounds, obtaining more direct measures of frog-pond and/or contextual effects, or selecting different variables to measure the two effects, which may involve different aspects of a group's influence. Burstein's preference is for the latter two suggestions.

As noted above, the results of this study (and Burstein) suggest a need for greater specificity in the unit of analysis in decomposing group effects, in the constructs that theoretically comprise the group effect (e.g., contextual, frog-pond, or other), and, more specifically, in our conceptual models of the college student attrition process. This study has taken a tentative step beyond the assessment of dummy coded group effects and toward the

decomposition of those group effects into some of their component parts. But the step is clearly tentative. As Burstein notes (1980, p. 153): "Although more proximal than the use of . . . dummy variables, contextual and frog-pond effects as measured by [group means, or individual deviations from group means] are still too mechanical and are distally related to the sociological and psychological processes that they are intended to represent."

Despite the limited nature of the data set and the somewhat imprecise specification of the components of a group effect, this attempt to move beyond dummy coded group effects has implications for future research on the impacts of college on students. The study applied a methodology common in the "school effects" literature of sociology, but virtually unused in the study of collegiate institutions and the educational outcomes they seek to produce. Given that a contetxtual influence was discernible in this somewhat limited data set, based on students at a single institution and dealing with only one possible educational outcome, it seems reasonable to suggest the potential fruitfulness of more precise applications of this approach for decomposing other global effects (e.g., academic majors, social or extra-curricular groups) into their more discrete, specific, contextual/compositional effects. Such decomposition could be extremely enlightening in the analysis of institutional effects in multi-institutional studies. Instead of being limited to dummy coded, inter-institutional comparisons based on type, curricular structure, mission, and so

on, the thinking that underlies contextual analysis, together with the finer specification of the processes believed to operate among and within groups, offers higher educational researchers considerable promise for developing a refined and fuller understanding of the complex processes operating within colleges and universities.

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TABLE 1

SUMMARY OF RESULTS OF SETWISE
MULTIPLE REGRESSIONS

Variable Set	Men (n=399) Cumulative R^2	Men (n=399) Change in R^2	Men (n=399) d.f.[a]	Women (n=357) Cumulative R^2	Women (n=357) Change in R^2	Women (n=357) d.f.[a]
Individual:						
Pre-college traits	.016	.016	10/388	.076**	.076**	10/364
Integration measures	.260***	.244***	7/381	.292***	.216***	7/339
Contextual:						
Pre-college traits	.278***	.018	10/371	.303***	.011	10/329
Integrative measures	.307***	.029*	7/364	.305***	.002	4/325[b]

[a] Degrees of freedom are for R^2-change.

[b] Due to extreme collinearity, the institutional and goal commitment scale, college extra-curricular activities and freshman cumulative GPA contextual variables did not enter the analysis. Thus, the numerator degrees of freedom are reduced by 3.

*$p < .05$

**$p < .01$

***$p < .001$

TABLE 2

BETA WEIGHTS FOR CONTEXTUAL

INTEGRATION VARIABLES FOR MEN

Integration Context Variables	Beta Weight
Intellectual and academic development	-.03
Faculty concern for student development and teaching	.14
Faculty relations	-.12
Peer relations	-.02
Institutional and goal commitment	.40**
Extra-curricular activities	.10
Freshman-year cumulative GPA	.34

**$p < .01$ ($F = 6.872$, d.f. = 1/364)